



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 09/369,340 | 08/06/1999 | MACOLM SLANEY | 013155-031 | 6668 |
| 21912 | 7590 | 08/12/2004 | EXAMINER | |
| VAN PELT & YI LLP 10050 N. FOOTHILL BLVD #200 CUPERTINO, CA 95014 | | | MICHALSKI, JUSTIN I | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2644 | |

DATE MAILED: 08/12/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|--------------------------------------|--------------------------------------|--|
| Office Action Summary | Application No. 09/369,340 | Applicant(s) SLANEY ET AL. | |
| | Examiner Justin Michalski | Art Unit 2644 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 December 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-36 is/are pending in the application.
- 4a) Of the above claim(s) 23-31 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-23 and 32-36 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. This application contains claims 23-31 drawn to an invention nonelected without traverse in the reply filed on 19 May 2004. A complete reply to the final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144) see MPEP j 821.01.

Response to Arguments

2. Applicants' arguments filed 16 December 2004 have been fully considered but they are not persuasive.

Regarding Claims 1-18, applicants argue on page 7 lines 6-12 that Lambrecht does not disclose a model which maps observable characteristics of a plurality of individuals to audio-related HRTF data for the individuals. The Office respectfully disagrees. Webster's New Collegiate Dictionary, 1977, G. & C. Merriam Co., pages 792-793, define "observe" as "to make a scientific observation". Lambrecht discloses determining HRTF for a subset of the general population which consists of various combinations of head, pinnae, and auditory canal characteristics (which will inherently be "observed" by scientific observation) (Col. 1, line 61 through Col. 2, line 1).

Regarding Claims 19-22, the applicants further argue page 7, lines 20-26 that Lambrecht does not disclose computing a model which defines a coupling between the physical characteristics of a person and that person's head-related transfer function. This is not persuasive as Gardner is used to teach a model which defines a coupling

between the physical characteristics of a person and that person's head-related transfer function.

Regarding Claims 32-36, the applicants further argue page 8, lines 4-7 regarding claims 32 for the same reasons as claims 1. For the reasons stated above for claim 1 the argument is not found persuasive.

3. The following rejection stands as previously presented in the action mailed 12 August 2004.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1, 9-11, and 32 are rejected under 35 U.S.C. 102(b) as being anticipated by Lambrecht (US Patent 6,181,800).

Regarding Claim 1, Lambrecht discloses a method for estimating a head-related transfer function (HRTF) for an individual, comprising the steps of: training an estimation model which maps observable characteristics (HRTF, Col. 1, line 67) of a plurality of individuals to audio-related HRTF data for the individuals (Col. 1, line 62 through Col. 2, line 5), respectively; obtaining observable characteristics for a subject whose HRTF is

unknown (Col. 4, lines 22-36); and processing in accordance with said model to produce an estimate of an HRTF for said subject (Paragraph bridging columns 4 and 5).

Regarding Claims 9, Lambrecht further discloses that the HRTF affected by the size and shape of the head, the size and shape of the pinnae, the characteristics of the ear canal, and the relationship of the shoulder to the ear (Col. 1, lines 24-30), i.e. physical dimensions of individual.

Regarding Claim 10, Lambrecht further discloses the size and shape of the head which will inherently include the spacing between the ears (Col. 1, lines 24-30).

Regarding Claim 11, Lambrecht further discloses the size and shape of the head and the relationship of the shoulder to the ear (Col. 1, lines 24-30).

Regarding Claim 32, Lambrecht discloses a system for generating spatial sound (Figure 1), comprising: a sound source which produces plural sound signals that are respectively associated with different locations relative to a listener (speakers 104 a and 104b); a head-related transfer function (HRTF) estimator which processes at least one image of the listener in accordance with a model that maps observable characteristics of a plurality of individuals to audio-related HRTF data for the individuals (Lambrecht discloses storing one or more head related transfer functions (Col. 2, lines 45-46), to produce an estimate of a HRTF for the listener (control unit outputs signals of one of the stored head related transfer functions, Col 2, lines 46-49); an HRTF filter which modifies said sound signals in accordance with the estimated HRTF for the listener (Control unit adjusts one or more of the parameters, Col. 2, lines 51-54); and an audio output device for generating sounds represented by the modified sound signals (speakers 104).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 2-7, 12, 13, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lambrecht as applied to claim 1 above in view of Gardner (US Patent 6,243,476).

Regarding Claim 2, Lambrecht discloses a method as stated apropos of claim 1 above but does not disclose observable characteristics are derived from an image of an individual's ear. Gardner teaches a method of formulating a HRTF based on head motion (Col. 2, lines 29-34) to correct for changes in orientation (Col. 1, lines 18-22) by using a camera that generates an electronic picture signal that is interpreted by tracking unit 125 which derives the position of the users head relative to the speakers (Col. 10, lines 31-36). It is inherent that the picture of the users head will include the users ears. Therefore, it would have been obvious to one of ordinary skill in the to derive characteristics from an individual's ear to correct for changes in orientation as taught by Gardner resulting in a more matched HRTF.

Regarding Claims 3-5, Gardner further discloses taking an electronic picture of the users head which will inherently include the location, relative orientation, and shape of the ears on the head (Col.10, lines 29-40).

Regarding Claim 6, Lambrecht further discloses said shape determined relative to a canonical ear template (i.e. average HRTF's Col. 1, lines 62-67).

Regarding Claim 7, Lambrecht further discloses the HRTF is affected by the size and shape of the ear, i.e. three-dimensional (Col. 1, lines 24-30).

Regarding Claim 13, Gardner further discloses use of the interaural time delays (Col. 7, line 53).

Regarding Claim 15, Gardner further discloses use of Fourier transforms (Col. 15, lines 4-5).

Regarding Claim 12, Lambrecht discloses a method as stated apropos of claim 9 above but does not disclose the dimensions are derived from an image of the individual. Gardner teaches a method of formulating a HRTF based on head motion (Col. 2, lines 29-34) to correct for changes in orientation (Col. 1, lines 18-22) by using a camera that generates an electronic picture signal that is interpreted by tracking unit 125 which derives the position of the users head relative to the speakers (Col. 10, lines 31-36). It is inherent it is inherent that the image will include physical dimensions of the individual. Therefore, it would have been obvious to one of ordinary skill in the to derive physical dimensions from the image to correct for changes in orientation as taught by Gardner resulting in a more matched HRTF.

8. Claims 19, 20, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gardner (US Patent 6,243,476) in view of Lambrecht (US Patent 6,181,800).

Regarding claim 19, Gardner discloses a method for estimating a head-related transfer function for a given person, comprising the steps of: computing a model (tracker 125 and storage and interpolation unit 130) which defines a coupling between the physical characteristics of a person (electronic picture from camera, Col. 10, lines 31-36) and that person's head-related transfer function; providing an image of a person whose head-related transfer function is unknown to obtain data about physical characteristics of that person (camera, Col. 10, lines 31-36); and applying said data to said coupling model to estimate a head-related transfer function for that person (electronic picture). Gardner does not disclose obtaining a head-related transfer function for each of a plurality of individuals or providing at least one image of each of the individuals which depict physical characteristics of each individual. Lambrecht discloses a method for the estimation of a head transfer function of an unknown individual comprising the steps of obtaining a head-related transfer function for each of a plurality of individuals (i.e. average HRTF of the general population; Col. 1, line 66 through Col. 2, line 1) and providing at least one image of each of said individuals which depict physical characteristics of each individual (Lambrecht discloses HRTF is based on the size and shape of the head, ear, and pinnae, i.e. physical characteristics (Col. 1, lines 24-30). Lambrecht discloses that having a HRTF for a subset of a general population (i.e. plurality of individuals) increases accuracy and performance (Col. 2,

lines 1-5). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include a HRTF for a plurality of individuals in order to increase the accuracy and performance as taught by Lambrecht.

Regarding claim 20 and 21, Gardner further discloses taking an electronic picture of the users head which will inherently include the image of the person's outer ear (Col.10, lines 29-40)

Regarding Claim 22, Lambrecht further discloses the head-related transfer function is obtained by measuring each individual's response to a plurality of sounds which propagate from sources that are located at different respective positions relative to the individual (Fig. 1, speakers 104a and 104b, see paragraph bridging columns 3 and 4).

9. Claims 33 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lambrecht as applied to claim 32 above in view of Gardner (US Patent 6,243,476).

Regarding Claims 33 and 34, Lambrecht discloses a method as stated apropos of claim 32 above but does not disclose an image of an individual's ear. Gardner teaches a method of formulating a HRTF based on head motion (Col. 2, lines 29-34) to correct for changes in orientation (Col. 1, lines 18-22) by using a camera that generates an electronic picture signal that is interpreted by tracking unit 125 which derives the position of the users head relative to the speakers (Col. 10, lines 31-36). It is inherent that the picture of the users head will include the users ears. Therefore, it would have been obvious to one of ordinary skill in the to derive characteristics from an individual's

Art Unit: 2644

ear to correct for changes in orientation as taught by Gardner resulting in a more matched HRTF.

10. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lambrecht as applied to claim 14 above in view of Abel (5,659,619). Lambrecht discloses a device as stated apropos of claim 1 above. Lambrecht does not disclose frequency warping relating to a canonical HRTF. Abel discloses a method for reducing the complexity or length of HRTFs (Col. 3, lines 25-29) by using a frequency warped HRTF (Col. 4, lines 41-49). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include frequency warping to reduce the complexity of the HRTF.

11. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lambrecht as applied to claim 1 above in view of Bozich et al. (Hereinafter "Bozich")(US Patent 5,386,689). Lambrecht discloses a device as stated apropos of claim 1 above but does not disclose the use of neural networks. It is well known in the art that neural networks or training that result in an improved output response as disclosed by Bozich Col. 12, lines 23-30).

12. Claims 16, 17, 35 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lambrecht as applied to claims 1 and 32 above, and further in view of Barnhill (US Patent 6,128,608). Lambrecht discloses items as stated apropos of

Art Unit: 2644

claims 1 and 32 but does not disclose the use of support vectors or neural networks. It is well known in the art that support vectors and neural networks are used to "learn" about a function in order to produce an improved and more accurate signal output. Barnhill discloses that neural networks can be taught items which are not apparent to a human and that support vectors are used to optimize signal output (Col. 1, lines 45-49 and Col. 2, lines 8-16). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use neural networks and support vectors to produce an improved and more accurate output.

13. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lambrecht in view of Gardner as applied to claim 2 above, and further in view of Straforini et al. (US Patent 6,092,059). Lambrecht as modified discloses a method as stated apropos of claim 2 but does not disclose the use of grayscale being customized. Straforini et al. discloses a device which uses a camera to identify objects. Col. 13 (Table II) discloses a variety of objects that have different tones and minimum and maximum grayscale used. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include grayscale being customized in order to obtain information for an object of a range of tones and colors.

Conclusion

14. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Justin Michalski whose telephone number is (571)272-7524. The examiner can normally be reached on M-F 7-3:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sinh Tran can be reached on (571)272-7564. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


SINH TRAN
SUPERVISORY PATENT EXAMINER


SINH TRAN
SUPERVISORY PATENT EXAMINER

JIm